I. LISTING OF CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1-51. (Canceled)

52. (Previously Presented) A method of imaging a site within a subject comprising the steps of:

a) administering to the subject an effective amount of a composition comprising a radionuclide-labeled bis-aminoethanethiol (BAT)-targeting ligand conjugate; and

b) detecting a radioactive signal from the site by emission tomography.

53. (Previously Presented) The method of claim 52, wherein the emission tomography is positron emission tomography (PET).

54. (Previously Presented) The method of claim 52, wherein the emission tomography is single photon emission computed tomography (SPECT).

55. (Previously Presented) The method of claim 52, wherein the targeting ligand is a tissue-specific ligand.

56. (Previously Presented) The method of claim 52, wherein the subject is a mammal.

57. (Previously Presented) The method of claim 52, wherein the subject is a human.

58. (Previously Presented) The method of claim 52, wherein the site is in the breast, ovary, prostate, endometrium, lung, brain, or liver.

59. (Previously Presented) The method of claim 52, wherein the site is an area of inflammation.

60. (Previously Presented) The method of claim 59, wherein the area of inflammation is an infection.

61. (Previously Presented) The method of claim 52, wherein the site is a tumor.

62. (Previously Presented) The method of claim 61, wherein the tumor is breast cancer, lung cancer, prostate cancer, ovarian cancer, brain cancer, liver cancer, cervical cancer, colon cancer, renal cancer, skin cancer, head & neck cancer, bone cancer, esophageal cancer, bladder cancer, uterine cancer, lymphatic cancer, stomach cancer, pancreatic cancer, testicular cancer, lymphoma, multiple myeloma, folate-positive cancer, or estrogen-positive cancer.

63. (Previously Presented) The method of claim 52, wherein the radioactive signal from the administered composition localizes at the site.

64. (Previously Presented) The method of claim 52, wherein the radionuclide is ^{68}Ga, ^{62}Cu, or ^{64}Cu.

65. (Previously Presented) The method of claim 52, wherein the radionuclide-labeled bis-aminoethanethiol (BAT)-targeting ligand conjugate is a radionuclide-labeled ethylenedicysteine-targeting ligand conjugate.

66. (Previously Presented) The method of claim 52, wherein the targeting ligand is an anticancer agent, DNA topoisomerase inhibitor, antimetabolite, tumor marker, folate receptor targeting ligand, tumor apoptotic cell targeting ligand, tumor hypoxia targeting ligand, DNA intercalator, receptor marker, peptide, nucleotide, organ specific ligand, antibiotic, antifungal, antibody, glutamate pentapeptide, or an agent that mimics glucose.

67. (Previously Presented) The method of claim 66, wherein the targeting ligand is an anticancer agent.

68. (Previously Presented) The method of claim 67, wherein the anticancer agent is methotrexate, doxorubicin, tamoxifen, paclitaxel, topotecan, LHRH, mitomycin C, etoposide tomudex, podophyllotoxin, mitoxantrone, camptothecin, colchicine, endostatin, fludarabin, gemcitabine, or tomudex.

69. (Previously Presented) The method of claim 66, wherein the targeting ligand is a tumor marker.

70. (Previously Presented) The method of claim 69, wherein the tumor marker is PSA, ER, PR, CA-125, CA-199, CEA AFP, interferons, BRCA1, HER-2/neu, cytoxan, p53, endostatin, or a monoclonal antibody.

71. (Previously Presented) The method of claim 66, wherein the targeting ligand is a folate receptor targeting ligand.

72. (Previously Presented) The method of claim 71, wherein the folate receptor targeting ligand is folate, methotrexate, or tomudex.

73. (Previously Presented) The method of claim 66, wherein the targeting ligand is a tumor apoptotic cell targeting ligand or a tumor hypoxia targeting ligand.

74. (Previously Presented) The method of claim 73, wherein the targeting ligand is annexin V, colchicine, nitroimidazole, mitomycin, or metronidazole.

75. (Previously Presented) The method of claim 66, wherein the targeting ligand is glutamate pentapeptide.

76. (Previously Presented) The method of claim 66, wherein the targeting ligand is an agent that mimics glucose.

77. (Previously Presented) The method of claim 76, wherein the agent that mimics glucose is glucosamine, deoxyglucose, neomycin, kanamycin, gentamicin, paromycin, amikacin, tobramycin, netilmicin, ribostamycin, sisomicin, micromicin, lividomycin, dibekacin, isepamicin, astromicin, or an aminoglycoside.

78. (Previously Presented) The method of claim 77, wherein the agent that mimics glucose is glucosamine or deoxyglucose.

79. (Previously Presented) The method of claim 52, wherein the radionuclide-labeled bis-aminoethanethiol (BAT)-targeting ligand conjugate further comprises a linker conjugating the BAT to the targeting ligand.

80. (Previously Presented) The method of claim 79, wherein the linker comprises a water soluble peptide, glutamic acid, aspartic acid, bromo ethylacetate, ethylene diamine, or lysine.

81. (Previously Presented) The method of claim 79, wherein said linker is glutamate peptide or poly-glutamic acid.

82. (Previously Presented) The method of claim 80, wherein the targeting ligand is estradiol, topotecan, paclitaxel, raloxifen, etoposide, doxorubricin, mitomycin C, endostatin, annexin V, LHRH, octreotide, VIP, methotrexate, or folic acid.